

Management of atrophic mandibular ridge with mini dental implant system

Department of Prosthodontics,
Faculty of Dental Sciences, C.S.M.
Medical University (upgraded
K.G.M.C.), Lucknow, Uttar Pradesh,
India

Raghuwar Dayal Singh, Ramashanker, Pooran Chand

ABSTRACT

Mini dental implants (MDI) are ultra-small diameter (1.8 mm width), biocompatible titanium alloy implant screws, conceived and designed over 20 years ago by a board-certified Manhattan dentist, Sendax Victor. Dr. R. A. Bulard added a single-piece “O-ball” design to Dr. Sendax Victor concept. These implants can be used in atrophic ridges, flabby ridges, or in other cases where there is denture instability or lack of retention due to poor availability of residual bone. In this article, a case report of 55-year-old female patient is presented, with a severely atrophic mandibular ridge that was managed by the MDI system with an overdenture.

Address for correspondence:
Dr. Raghuwar Dayal Singh,
Type 4, Flat no. - 9, Butler Palace
Colony, Lucknow - 226 001, UP,
India.
E-mail: raghuwards@rediffmail.
com

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INTRODUCTION

Every dentist has experienced the problem of dealing with patients with atrophic ridges. The patients always return with complaints of instability of dentures. This problem is more pronounced in the mandibular arch.^[1] Due to less available tissue surface, denture adhesives have limited use in the mandibular arch. Traditional dental implants require a period of healing and tissue integration in a nonloaded capacity for optimum predictability.^[2] The mini dental implant (MDI) system can be immediately loaded and provides ongoing stabilization.^[3-6]

This article discusses a case report of a 55-year-old female patient with severely resorbed mandibular ridge by placement of 4 MDI with overdenture.

with the complaint of a loose mandibular denture. The patient was unable to chew or speak properly as the denture kept coming out. The patient had a history of complete teeth loss 20 years earlier due to periodontal disease. She has been using her current set of dentures for the past 1 month and has had no previous dentures.

Clinical examination revealed that the patient has completely edentulous upper and lower arches. No bony spicules or root pieces were seen and there was severely atrophic knife-edge mandibular ridge [Figure 1]. However, the maxillary ridge was favorable for denture construction. The patient has an Angles Class III ridge relation.

Treatment plan

After radiologic examination of the patient, it was observed that the patient had dense compact bone in the mandibular anterior region without any pathology. The blood reports of the patient also did not show any pathology to rule out surgery. Hence it was decided to place MDI on the mandibular arch and an overdenture over it.

Procedure

A new set of complete denture was fabricated for the patient [Figure 2]. The anatomy of the jaw was evaluated to determine the angulations of the implant.

CASE REPORT

A 55-year-old female patient reported to the clinic

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Figure 1: Knife-edged mandibular residual ridge

A Brasseler-type latch drill was used to open denser bone layers to facilitate the self-tapping and self-cutting features of the MDI system. (The speed of the drill should not exceed 1600 RPMs with adequate torque and irrigation.)^[7] Drills were only used to establish access angulation and pilot starting point for placement of the implant. The drilling technique typically involves no surgical incision or flaps. The drilling entry procedure was completed with a few pumping motions, resulting in light penetration past the dense cortex into softer, more trabeculated medullary bone. Sterile irrigation was utilized throughout the drilling procedure. (The desired site depth should not exceed one third to one-half the threaded length of the MDI itself.) A gentle up and down pumping motion was performed to prevent the drill tip from overheating and/or becoming bound and embedded into the patient's bone. Each sterile, double-pouched implant is suspended in a transparent vial for easy access and transmission to the implant site.

A small thumb carrier-wrench or finger driver was used to retrieve, convey and introduce the MDI into the target site after the initial pilot drilling process has been completed. The implant was carefully screwed clockwise into the site using rotation of the thumb and index finger on the knurled handle of the wrench until it became difficult to turn. The thumb wrench was then removed from the implant abutment head. The thumb wrench was replaced with a winged thumb wrench for more mechanical advantage and leverage. The implant was again turned gradually into the patient's bone until once again it bound to a point where it became difficult to turn. Then the winged wrench was removed from the implant abutment head.

A ratchet wrench was then used to slowly insert the implant into its final position. The neck of the MDI was fully inserted into the soft tissue (attached gingiva)



Figure 2: Old denture of the patient

so that only the abutment head is protruded into the oral cavity [Figure 3]. The tissue side of the patient's prosthesis was relieved so that it could be seated passively over the top of the seated implants. A soft blockout MDI shim was then placed on each inserted mini implant's square base portion of abutment head, leaving the O-Ball top half exposed for attachment placement. Keeper caps with IMTEC (3M Imtec Corp, Ardmore, Oklahoma, US) MDI O-Rings were then snapped onto the O-ball heads [Figure 4].

The patient's prosthesis was carefully examined to ensure a passive fit. A standard chair side self-cure acrylic mix was then prepared and placed into the denture, then seated with a functional bite into the patient's mouth over the top of the mini implants with the keeper caps attached. After an appropriate hardening time, the prosthesis was removed from the patient's mouth, the blockout shims discarded and excess acrylic material trimmed. The finished prosthesis, containing the keeper caps, was then replaced into the patient's mouth for occlusal equilibration and border adjustment [Figure 5].

DISCUSSION

In our clinical practice we regularly come across patients in whom we find it difficult to achieve optimum denture performance due to problems associated with reduced denture retention and stability. This can be due to a number of factors, such as reduced vestibular depth, flabby ridges, atrophic ridges and so on. MDI system can also be used for stabilization of a complete denture where bone quality is inadequate for standard implants.^[8-10] The system can be used for Type I and Type II bones.^[11] In Type I bone the standard propriety thread design can be used and in Type II bone the MDI MAX thread design is used.^[12] The advantages of using



Figure 3: Patient's ridge with 4 mini dental implants in place



Figure 4: Keeper cap fitted on each mini implant



Figure 5: Insertion of the denture into the patient's mouth

the MDI system in such cases are as follows^[13,14]:

- Immediate loading,
- Can be inserted in minimal tissues without relying on grafting techniques,
- Minimally invasive procedure,
- One-stage denture stabilization,
- Does not require osteotomy,
- Cost-effective,
- Can be placed in patients with ridge to narrow for conventional implants and
- A simple 5 steps technique.

CONCLUSION

MDI are an excellent and profitable addition to every dental practice. This system provides an immediate and ongoing stabilization for the patient in an economical and efficient manner. It is an extremely simple and safe procedure and can be done in cases with poor bone

quality as well. It opens many treatment modalities to the dentist and the patient.

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